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## Switching methods of self-harm at repeat episodes: findings from a multicentre cohort study

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## **Abstract**

### ***Background***

Self-poisoning and self-injury have widely differing incidences in hospitals and in the community, which has led to confusion about the concept of self-harm. Categorising self-harm simply by method may be clinically misleading because many hospital-attending patients switch from one method of harm to another on subsequent episodes. The study set out to determine the frequency, pattern, determinants and characteristics of method-switching in self-harm episodes presenting to the general hospital.

### ***Methods***

The pattern of repeated self-harm was established from over 33,000 consecutive self-harm episodes in a multicentre English cohort, categorising self-harm methods as poisoning, cutting, other injury, and combined methods.

### ***Results***

Over an average of 30 months of follow-up, 23% of people repeated self-harm and one-third of them switched method, often rapidly, and especially where the person was male, younger, or had self-harmed previously. Self-poisoning was far less likely than other methods to lead on to switching.

### ***Limitations***

Self-harm episodes that do not lead to hospital attendance are not included in these findings but people who self-harmed and went to hospital but were not admitted from the emergency department to the general hospital, or did not receive designated psychosocial assessment are included. People in the study were a mix of prevalent as well as incident cases.

### ***Conclusions***

Method of self-harm is fluctuating and unpredictable. Clinicians should avoid false assumptions about people's risks or needs based simply on method of harm.

### ***Key words***

Self-harm; suicide; longitudinal study

## 1. Introduction

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When someone uses the term ‘self-harm’ the person reading or hearing the words can’t usually be sure what it means. In newspapers, and on television, radio, and the internet, self-harm usually refers to self-injury, most often cutting. Among those who work in emergency services and hospital settings, on the other hand, the self-harm that they encounter is far more likely to be self-poisoning (‘overdose’) which, in the UK, is around four times as common among people who come to hospital as is cutting or other injury (Bergen et al. 2010). The age pattern of self-harm complicates the picture and partly explains the misconceptions: among those coming to hospital because of self-harm, younger patients present with self-injury (mainly cutting) in higher proportions than do older people (Horrocks et al., 2003). In the community, the pattern of self-harm among adults, and especially older adults, is unknown but it is clear that teenagers undertake considerably more self-injury than self-poisoning – although they do also report a great many self-poisoning episodes (Hawton et al., 2002). In general, clinical and epidemiological research reports are based on hospital practice rather than primary care or community surveys. Consequently, the research literature on self-harm tends to reflect the hospital rather than community pattern – and clinicians, researchers and the public are often at odds with each other in terms of their intended meaning.

This muddled perception matters because it has helped to shape the services provided for those who have attended hospital because of self-harm, most of whom have self-poisoned. Rather poorer care – much lower likelihood of psychosocial assessment and referral for aftercare – is the usual experience of people attending hospital as a consequence of self-cutting, even though they have significantly worse rates of non-fatal and fatal repetition than do those who have attended due to self-poisoning (Cooper et al., 2005; Lilley et al., 2008; Bergen et al., 2012; Hawton et al., 2012). This discrepancy between care and outcome, with hospital services seeming to categorise patients’ risks according to the method of self-harm, is complicated further by the high incidence of method switching by the same person on successive occasions (Lilley et al., 2008); categorising care according to method of self-harm seems to make little sense when so much switching of the method occurs in successive episodes. We have used a very large consecutive cohort of hospital self-harm episodes from the Multicentre Study of Self-harm in England to investigate the poorly delineated but common phenomenon of switching of self-harm method in order to determine its frequency, determinants and characteristics.

## 2. Method

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### *2.1 Setting and sample*

The study was undertaken in six hospitals in three cities currently involved in the Multicentre Study of Self-harm in England. The data used in the present analysis were collected on all patients who presented with non-fatal self-harm to general hospital Emergency Departments in Oxford (one hospital), Manchester (three), and Derby (two) for the 5-year period 1<sup>st</sup> January 2003 to 31<sup>st</sup> December 2007. Self-harm was defined as intentional self-poisoning or self-injury, irrespective of motivation (NICE, 2012). Further description of the multicentre project is set out elsewhere (Bergen et al., 2010; Hawton et al., 2007).

## **2.2 Data collection**

Following their attendance at hospital because of self-harm, a majority of patients received a psychosocial assessment (of mental state, risks and needs) by mental health specialists (and/or by Emergency Department staff in Manchester) (Kapur et al., 2008), in line with clinical guidance (NICE, 2004, 2012; Royal College of Psychiatrists, 2004). Demographic, clinical, and hospital management data on each episode were collected in Oxford and Manchester by clinicians using standardised local forms, while data in Derby were entered directly on to an electronic patient record system by clinicians. Patients not receiving an assessment were identified through the scrutiny of Emergency Department records and medical records (electronic records in Derby), from which more limited data were extracted by research clerks. In all centres, patients not assessed might have taken early discharge, or did not receive an assessment – for clinical reasons, or due to unavailability of staff, or because they refused it. Data for this study included sex, age, date of self-harm, method of self-harm (including drugs used in self-poisoning and type of self-injury), alcohol involvement, previous mental health care and self-harm, admission to the general hospital, and psychosocial assessment; data on admission to the general hospital were not available for Derby at the time of the database's construction.

## **2.3 Ethical approval**

The monitoring systems in Oxford and Derby have approval from local health or psychiatric Research Ethics Committees to collect data on self-harm for local and multicentre projects. Self-harm monitoring in Manchester is part of a clinical audit system, and has been ratified by the Local Research Ethics Committee. All three monitoring systems are fully compliant with the Data Protection Act of 1998. All centres have approval under Section 251 of the NHS Act 2006 (formerly Section 60, Health and Social Care Act 2001) to collect patient identifiable information without patients' consent.

## **2.4 Switching of self-harm method**

For the purpose of exploring switching of method, we designated the method used at each episode as one of five categories: Ingestion of poisons (mainly medicines but including non-ingestible substances such as bleach, and hereafter called 'poisoning'); cutting; other injury (severe); other injury (less severe); and a combination of injury and poisoning. The non-cutting (other) injuries are a very mixed group and we established a category consisting of episodes that we deemed more severe: jumping from a height, hanging or asphyxiation, carbon-monoxide poisoning, drowning, and gunshot wounds; carbon monoxide poisoning was included here because it is not poisoning by ingestion. We were aware that the remaining, 'less severe' category is highly heterogeneous and contains a mixture of more and less life-threatening actions (traffic-related and 'other' injuries).

In the enquiry into method switching we took two approaches to the analysis. Initially we examined the first switch of method, if there was one. This analysis thereby deals with the *people* in the study who switched method, while in the second analysis we examined the total number of *episodes* – taking into account each episode in relation to the one immediately preceding it. The analysis was a repeated measures logistic regression within a generalized linear model that accounted for the lack of independence in the repeated episodes, constructed by using the cluster option in STATA to obtain robust standard errors. This method allowed us to determine whether a person switched method at any time during the study, and permitted examination of the pattern of switching – for

example whether it was from poisoning to cutting, cutting to a combination of injury and poisoning, and so on. In this part of the analysis, for practical reasons, we examined only up to the first 20 episodes for each person (index episode plus 19 repeats), especially as the frequency distribution showed that repetitions in excess of 20 happened rarely; index episode here is taken to mean first episode in the study period – not necessarily the first ever episode.

The study data were extracted from a combination of routinely recorded clinical records and research monitoring forms completed by clinicians. As with all studies of this kind – with many patients and clinical staff involved and a rapid throughput of cases – there were missing items of data. In presenting the results the denominator figures are included so that it is clear where there were missing items.

Study data were analysed using three computer-based statistical applications: SPSS version 20, Stata version 12, and R version 2.14. SPSS was used for the compilation and transfer of the data, and for univariate analysis; Stata was used for logistic regression and zero-inflated Poisson models; and R was used to construct conditional inference trees. These statistical tree models help to identify the contributing factors associated with method switching. We have presented the tree analysis in two ways – first, with switching as an event that happens or not, and, second, using a survival analysis to examine the rapidity of any switching. Censoring in the survival analysis was undertaken when a further episode of non-fatal self-harm was recorded in the monitoring data. In our models, Alpha was set at 0.01 because of the multiple testing that occurs in the modelling; in the case of the inference trees, this strict level of significance also helped to reduce the complexity of the final models. In the method used here for the construction of the conditional inference trees, when a branch variable was missing surrogate variables were not employed – although they can be used in other conditional inference modelling techniques.

### 3. Results

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The study sample of 21,255 individuals, 12,467 (59%) female and 8755 (41%) male (for 33 people gender was unrecorded), undertook 33,880 episodes of self-harm leading to hospital attendance. Of these people, 4721 (22.5%) repeated self-harm: 2820 (22.6% of the 12,467) females and 1888 (21.6% of the 8755) males. These 4721 people, because of multiple repetition, accounted for 11,610 episodes. The study duration was 5 years, with patients followed up from between 1826 days (five years) and 1 day (for the patients included on the last day of study). The average length of follow-up was thereby 913 days (2.5 years); an assumption of uniform incidence of self-harm during the study was borne out by our findings. The proportions of people repeating were similar across the three centres (24% Oxford, 24% Derby, 20% Manchester). As the three general hospitals in the City of Manchester are situated in a large conurbation with other emergency hospitals close by, we considered whether repeat episodes were more likely in Manchester than in our other sites to result in attendance at a neighbouring hospital not involved in the study – and thereby not be picked up by our case-finding of repeat episodes. Local audit of attendances at Emergency Departments in nearby hospitals showed, however, that fewer than 5% of Manchester residents who attend hospital attend neighbouring hospitals outside the City of Manchester (Kapur et al., 2008). Further characteristics of

the clinical care of patients in Oxford, Manchester and Derby can be found in other published work from the multicentre monitoring project (Bergen et al., 2010, 2012).

Among those people who repeated during the study, self-poisoning was the method used in 78% (3696/4709) of index episodes; cutting in 15% (689); combined injury and poisoning 4.6% (215); other injury (severe) 1.4% (66); and other injury (non-severe) 0.9% (43); in 12/4721 cases the method used was missing from the data. Of those who repeated, one-third (1620/4721, 34%) switched method at some point in the study. Of those who switched method, 59% (954/1620) switched just once, 24% (399) twice, 7% (108) three times, and 10% (159) four or more times. Switching occurred with similar frequency in the three cities (37%, 35%, 33%). Although repetition of self-harm and switching of method are important outcomes, ones that this research investigates in detail, it should be emphasised that the above findings show that most people don't repeat self-harm following a hospital attendance, and those who do are fairly likely to return with another episode that employed the same self-harm method.

### ***3.1 Factors associated with switching***

Switching of self-harm method was more common among males than females (37%, 692/1888 vs 33%, 922/2820; difference 4.0%, 95% CI 1.2 to 6.7%), as set out in Table 1. The small excess of switching among males was mainly due to them undertaking single rather than multiple switches; Table 1 shows that 63% of males who switched did so just once, with the remaining 37% spreading switching across two, three, four or more occasions – a pattern of switching significantly different from that seen among females. Switching was also slightly more common when alcohol was not consumed at the index episode (35% vs 31). There was a clear relation between method switching and history of mental health care and of previous self-harm: 37% of people who repeated and who reported (or were recorded as having received) any previous mental health treatment switched method, compared with only 28% of those with no such history – those who reported previous mental health care seemed especially likely to undertake multiple switches of method (Table 1). Similarly, far more patients who already, by the time of the index episode, had a history of previous self-harm switched method (38%) than did those who had no such history (24%); once again, the excess of switching was related to a much higher frequency of multiple switching.

Method switching at a subsequent episode showed a very strong relation to the method used in the index episode (Table 1). If the index episode was one of poisoning, switching occurred in only 24% of people; if the index episode was by cutting, as many as 64% switched method; other injury (severe), 77%; other injury (less severe), 93%; and if injury and poisoning combined, 93%. One point concerning the distinction between proportions and raw numbers is worth noting: although self-poisoning was associated with the lowest proportion going on to switch, due to their large number poisoning index episodes were associated with more method switching than were all other self-harm methods combined (881/1614, 55%). Whether switching was multiple or occurred just once showed no distinct pattern according to method of self-harm, although proportionally rather more of those who switched after an index episode of poisoning did so on multiple occasions than was the case with any other category of method of index self-harm.

Switching was also more frequent among those who were not admitted to the general hospital at their index episode (40% versus 30%). This finding is likely to be a consequence of the lower

prevalence of hospital admission for cutting than for poisoning; the pattern of single as opposed to multiple switching was almost identical regardless of whether patients were admitted at the index episode (Table 1).

[Table 1 about here]

### **3.2 Models of switching behaviour**

In an observational study of this kind, confounding is a substantial concern. We used three approaches to deal with multiple variables in the analysis.

#### **3.2.1 Patient-level analysis**

At the level of individual patients (4721 people who repeated self-harm) we modelled the outcome of switching using logistic regression to identify the independent determinants of switching method on at least one occasion when patients repeated self-harm. The model largely confirmed the findings above, based on successive analysis of single variables. Males were more likely to switch and switching decreased with age (Table 2a). Previous self-harm evident at the first episode in the study period, whether recent or some time past, was a predictor of switching, as was receipt of current outpatient mental health care. As expected, from the univariate findings and from clinical knowledge, the method of self-harm at the index episode was, by a large margin, the most powerful predictor: compared with those who had self-poisoned at the index episode, people with non-cutting injuries, those who combined methods, and those who cut themselves were all far more likely to switch method when repeating self-harm (Table 2a). Other variables in the model – previous mental health care, alcohol consumption around the time of the episode, and admission to hospital as a consequence of the index episode – were not independent predictors of switching.

It is a logical consequence of multiple repeating of self-harm that switching of method of harm is more likely among people who have undertaken more repeat episodes during the study period. In order to account for this effect, we fitted mathematical models with outcome number of switches and exposure number of episodes, with other covariates also included. A zero-inflated Poisson model provided a more meaningful model than did standard Poisson modelling (using the Vuong test), probably because of over-dispersion of data due to excess zero values in the data. We found that, with the effect of multiple episodes accounted for in this way, the predictors of switching (Table 2b) were almost exactly the same as those found above using the logistic regression model although the adjustment for number of episodes has the effect of lowering the odds ratios. In this analysis we found that rates of switching (indicated by incident rate ratios, Table 2b) were lower with increasing age but higher among males, those who had previous self-harm or mental health care, and people currently receiving outpatient mental health care. Rates of switching were much higher among those who at their first (index) episode in the study had non-cutting injuries, had combined methods, or had cutting injuries; use of combined methods at the index episode, for example, indicated a rate of subsequent switching that was 2.4 times that of people who had self-poisoned at index episode (Table 2b).

[Table 2 about here]



Using the modelling technique of conditional inference trees, the influence of several variables can be displayed as set out in Figure 1. The bar charts in the figure suggest that method used at index episode, previous history of self-harm, and gender are the only variables that showed a clear effect on the pattern of switching with the level of significance (alpha) set at 0.01. Other variables in this model were: age, alcohol taken at time of self-harm, history of mental health treatment, receipt of current mental health treatment, and the city where data were collected. Due to missing data for several of these variables, the 1620 episodes of switching were reduced in the modelling analysis to 1146 switches of method. Self-poisoning was associated with far less switching than were other methods of self-harm, and male sex was associated with more switching among those who self-poisoned. Cutting was associated with substantially more switching, especially among people who had attended hospital due to self-harm for the first time (had no reported previous episodes). But it was those whose index episode was by other injury or by combined methods who were the most likely to switch at repetition.

[Figure 1 about here]

### **3.2.2 *Speed of repetition***

In order to examine the time-pattern and speed of switching, and to maximise the detail in the data on timing of switching, we carried out a survival analysis, which builds a model that takes account of varying length of follow-up. As with the earlier analysis, we used the data that determined whether there was or was not a switch – attending only to the first of any such switches and its time since the index episode. Based on the conditional tree approach, Figure 1 shows the survival model as well as the more simple proportions model. The patients represented were those who repeated self-harm during the study (N=4702 when missing data on gender were accounted for) and the event that is being plotted on the Kaplan-Meier curves is switching of method at repetition. Other variables in this model were: age, alcohol taken at time of self-harm, history of mental health treatment, and city where data were collected.

The probability model (alpha 0.01) once again pointed to five separate time patterns of switching – each augmenting the simple bar chart shown above it (Figure 1). Each of the five curves has a shape that might be expected from the final proportions who have switched. In each case, there is an early rate of switching that eases off as time passes. All of the curves show the same characteristic: half of all of the switches that occurred in the five year study period took place within the first six months. The findings of these models are in keeping with what was found with analyses based on simple proportions: self-poisoning at the index episode is associated with a slower incidence of method switching than is cutting at the index episode; among those who had cut themselves at the index episode, those without a history of earlier self-harm showed considerably faster switching. People attending hospital following multiple and other injury methods tended to switch method rapidly.

### **3.2.3 *All repeat episodes***

The inclusion of all recurrent episodes of self-harm (11,610 episodes) in the model so that each recurrence was paired with its immediately preceding episode, rather than restricting the analysis to the first switch, necessitated a logistic regression model that used robust standard errors to take account of the non-independence of each person's subsequent episodes. As before, we found that each extra year of age was independently associated with a small decrease in likelihood of switching.

Previous and current mental health care showed significant but modest effects: odds ratios for previous care 1.7 (95% confidence interval 1.4 to 2.0), for being a current psychiatric out-patient 1.6 (1.4 to 1.9), and for being a current psychiatric in-patient 2.1 (1.3 to 3.3). In this multiple-episode model, previous self-harm no longer showed an independent effect, and neither did alcohol consumption or gender. What is most apparent from the multiple-episode model is a large predictive effect of method of self-harm at any given episode: compared with self-poisoning, the odds ratios for switching at the next episode were: 51 (95% confidence interval 29 to 90) for combined methods, 48 (13 to 167) for other injury (less severe), 15 (9 to 27) for other injury (severe), and 5.6 (4.4 to 7.0) for self-cutting.

Another way of representing the pattern of switching is to consider the repetitions in a simple algorithm of the sequence of events. Of the 11,610 recurrent episodes of self-harm, 8592 (74%) did not feature switching of method from that used in the preceding episode. In the 3018 episodes where switching took place it occurred, broadly speaking, about equally away from each method as towards it: 1323 switches were away from self-poisoning and 1225 towards it; combined methods showed 537 switching from and 536 switching towards; cutting 905 from and 956 towards; other injury (severe), 137 from and 161 towards; and other injury (less severe), 116 from and 140 towards.

## 4. Discussion

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In few, if any, investigations has such a large study population been monitored over years in order to get a clear picture of recurrent non-fatal self-harm. The present findings make it plain that switching method is a common occurrence. While, as expected, there are people who switch from every kind of self-harm method to every other kind, there appear to be five main findings. First, those who have come to the hospital as a consequence of any type of self-injury are more likely to switch method, and to do so sooner, than are those who have self-poisoned. Looking at injuries in more detail, switching method is a frequent occurrence among those who have attended because of self-cutting but where an episode has been characterised by combined methods or non-cutting injuries, a switch is extremely likely to happen and soon after the index episode. Second, each method of self-harm has about as many people switching away from it as switching towards it, so there is no clinically useful predictability to be found in the pattern. Third, because self-poisoning is much the commonest method, a great many people who have attended hospital because of self-injury, and cutting in particular, have returned to the hospital before long with an episode of self-poisoning. Fourth, switching happens quickly – regardless of the initial method of self-harm. Fifth, the younger people are, the more likely is a subsequent switch in method.

Although it is clear from other studies (Runeson et al., 2010; Bergen et al., 2012) that especially dangerous physical methods (such as hanging, strangulation, asphyxiation, and gassing) used in non-fatal self-harm are associated with an excess of subsequent suicides, the present findings show that, in the psychosocial assessment that should follow self-harm (NICE, 2004), the method of harm should not be used as a guide to static and unchanging needs and risks. Method of self-harm is fluctuating and unpredictable; service responses need to be flexible and should avoid false assumptions about future risk based simply on method of harm. This argument is borne out by a growing literature that is establishing self-cutting as a cause for prognostic concern, when it has too

often been regarded as of low short- and long-term risk. A 2005 study in Manchester, UK (Cooper et al., 2005) found that suicide was almost twice as likely following self-cutting as after self-poisoning, although the finding fell short of statistical significance. A Swedish national study reported that self-cutting and self-poisoning showed the same incidence of subsequent suicide (Runeson et al., 2010). In a study that draws on some of the data from the present research, suicide was found to be significantly more likely after self-cutting than after self-poisoning (Bergen et al., 2012), a finding replicated among children and adolescents (Hawton et al., 2012).

This re-evaluation of the significance of hospital attendance due to self-cutting is important because people who self-harm by cutting have often been deemed to be at lower risk than those who have self-poisoned. As a consequence, their hospital care is frequently less adequate than that received by those who self-poison, and people who have cut themselves are less likely to receive a psychosocial assessment while at the hospital (Horrocks et al., 2003; Gunnell et al., 2005; Lilley et al., 2008; Kapur et al., 2008; Cooper et al., 2013). There are, of course, other potential explanations of a relative lack of psychosocial assessment for those who have harmed by cutting: compared with those who have self-poisoned, those who have self-cut need a shorter time in the ED, are less likely to be admitted to general hospital inpatient care, more likely to discharge themselves without clinical agreement, and they may be subject to greater stigma; these features of care are not examined in the present study.

The present study was not designed to examine outcomes other than non-fatal repetition so does not assist with answering the question about whether there is an identifiable clinical pattern of switching method in a progressively severe way, heading towards suicide; we looked for and found no evidence to support that notion. Another publication from the multicentre monitoring research project focussed on the most recent episodes before suicide and found no specific sequences leading up towards suicide (Bergen et al., 2012).

## 5. Limitations

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In each self-harm episode included in this study the patient attended the general hospital, usually visiting the emergency department. It is a limitation of this work, as with all of the relevant literature in this area, that self-harm episodes in the community that do not lead to hospital attendance are not included. We would emphasise, however, that the 33,000 episodes here represent consecutive attendances and include *medical* patients discharged from either the emergency department or inpatient wards even when no psychosocial assessment was carried out; much of the international literature on the topic is undertaken on selected study populations only of general hospital inpatients, or patients who received psychosocial assessment, or patients admitted to psychiatric care.

In cohort studies of self-harm it is usual, as we have done here, to examine the outcomes after an index episode that is not a person's first attendance at hospital as a consequence of self-harm. There is, consequently, an arbitrary nature to the starting time of the study and thereby of the index episodes – each is simply the first episode after the start date of the cohort study. In the present study, in a way that is typical of this kind of monitoring of regular clinical practice, we were not always able to include the variable concerning history of earlier self-harm because it was missing (in 28% of cases) from the clinical records. Where the variable was recorded, in only 26% of cases (878/3399, Table 1) was the index episode a first occasion of self-harm, and only 24% (210/878) of the people new to hospital attendance because of self-harm went on to switch method. Any attempt

to extract an inception cohort from the data and analyse its participants separately would reduce the number of people in the sample who have switched method to 13 % (210/1620) of the switching sample actually used in our analyses. We have not done that analysis because it would result in too few episodes to allow for adequate precision for the findings concerned with switching of method. We deem our comparative findings of the risk factors and determinants of switching method to be reasonably robust despite the study population being one of predominantly prevalent rather than incident cases.

There are further potentially confounding factors that are unaccounted for in the present study – due to the nature of the routinely collected data on which the analysis is based. For example, we do not know about the psychiatric diagnoses of the people who self-harmed, and depression, substance use and personality factors might all be determinants of repetition and switching.

## 6. Conclusions

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Non-fatal self-harm leads to a huge number of hospital attendances – in this study over 30,000 episodes engaged in by over 20,000 people across just three medium-to-large sized cities in five years. Although the hospital service for those who have self-poisoned is far from perfect, we know from the research literature that services generally deal with self-cutting in a much less satisfactory way – with a high proportion of those who have cut themselves discharged without receiving adequate assessment. Some of the premature discharge of those who have attended because of cutting will be due to their greater tendency to self-discharge (perhaps due in part to negative staff attitudes) (Cooper et al, 2013), but much of the discrepancy between proper assessment for those who have cut and those who have poisoned is a result of clinical decisions. The only justification for differential care might be that self-cutting is established as a stable and less risky behaviour than poisoning. Instead, the present study shows that self-harm is a changing, fluid pattern of behaviour – and the emerging literature on suicide is showing that self-cutting is at least as likely as is self-poisoning to precede suicide. At a time when the introduction of DSM-5 seems to be placing emphasis on imputed motivation as the decisive factor in the classification of self-harming behaviour, the findings of the present study strongly support retention of terminology for self-harm that is in keeping with proven facts. We have argued previously (Kapur et al., 2013) that the terminology of *Non-Suicidal Self-Injury* has insufficient evidence to support its establishment in classification and that there are many grounds for opposing its adoption into our nomenclature (Kapur et al., 2013); the prevalence and variety of method switching seen among the patients in the present study points to retention of the purely descriptive term *self-harm*. In terms of practical implications, it is plain that our findings support the strong guidance from the UK National Institute for Health and Care Excellence (NICE) that all patients who have self-harmed receive an adequate psychosocial assessment of their needs and risk before their discharge from the general hospital (NICE, 2004) – irrespective of their method of self-harm.

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Figure(s)

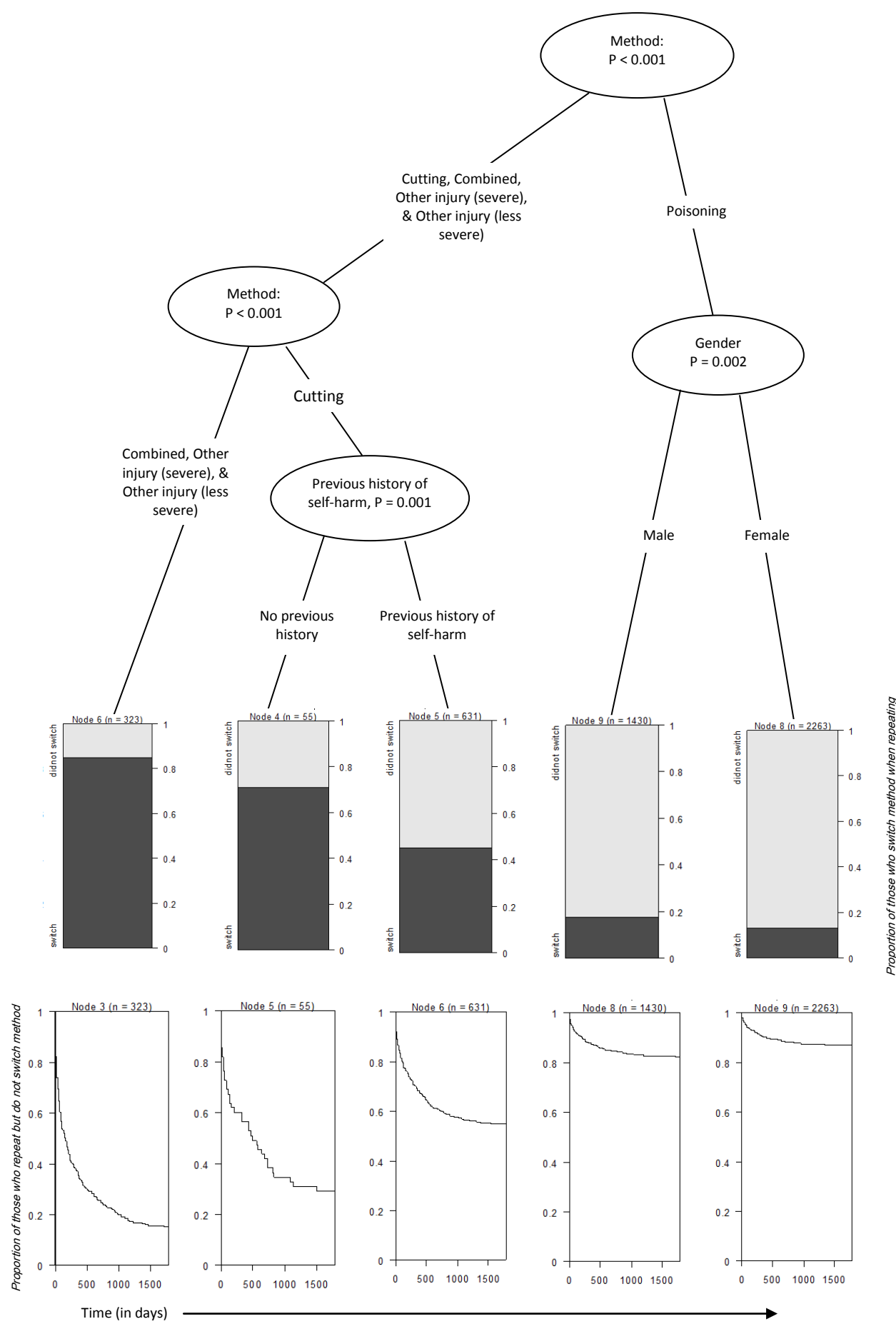


Figure 1: pattern of switching method of self-harm, or not, according to variables that show effect at a significance level of alpha 0.01. All people represented (N=4702) repeated self-harm but only some of them switched method. The analysis includes a conditional tree model; nodes not displayed show no significant or important effect on switching. In the upper row of barcharts dark areas represent proportions of people switching method at repeat self-harm; the lower row of Kaplan-Meier survival curves model the time without switching self-harm over five years (1825 days).

## Switching methods of self-harm at repeat episodes: findings from a multicentre cohort study

### Highlights

- Method used for self-harm may alter in successive episodes in individual patients
- Of those who repeat, one-third switch method, e.g. from self-injury to poisoning
- Switching is commoner if young, male, self-injured, or following previous episodes
- Risk of self-harm repetition cannot be assumed on the basis of the method of the harm
- All patients require assessment of needs and risks regardless of method of self-harm



					Number of switches (within up to 20 episodes per person): only percentage proportions (not actual numbers) are shown for each row				Chi squared test
	Number of people	Percentage proportion (No. of people) who switched	Difference in two proportions		1	2	3	4 or more	
Male	1888	37% (692)	4.0%		63%	24%	6%	7%	14.90, 3 df P = 0.002
Female	2820	33% (922)	(95% CI 1.2 to 6.7)		55%	26%	7%	12%	
No alcohol consumed in association with self-harm	1368	35% (480)	3.6%		62%	23%	6%	9%	2.05, 3 df P = 0.56
Alcohol consumed	2142	31% (674)	(95% CI 0.42 to 6.8)		59%	24%	7%	10%	
Previous mental health care	2163	37% (801)	8.7%		55%	25%	8%	12%	30.45, 3 df P < 0.001
No previous care	1153	28% (327)	(95% CI 5.4 to 12.0)		69%	23%	5%	3%	
Previous self-harm	2521	38% (956)	14.0%		54%	26%	8%	12%	30.83, 3 df P < 0.001
No previous self-harm	878	24% (210)	(95% CI 10.6 to 17.4)		74%	18%	5%	3%	
Index episode method:									
poisoning	3696	24% (881)	Chi squared		53%	30%	6%	11%	
cutting	689	64% (441)	903.8, 4 df		63%	21%	8%	8%	
other injury (severe)	66	77% (51)	P < 0.001		74%	12%	6%	8%	
other injury (less severe)	43	93% (40)			68%	20%	7%	5%	
combined	215	93% (201)			70%	14%	6%	10%	
Admission to general hospital after index episode*:									
not admitted	1296	40% (516)	9.4%		59%	23%	8%	10%	1.21, 3 df P = 0.75
admitted	2094	30% (637)	(95% CI 6.1 to 12.7)		59%	24%	6%	11%	

\* Hospital admission data were only available for Oxford and Manchester

Table 1: Switching of self-harm method at repetition, according to various factors evident at first episode in the study period

Variable	(a) Values for risk of switching on one occasion derived from logistic regression			(b) Values for risk of repeated switching derived from zero-inflated Poisson regression		
	Odds ratio	95% CI	P value	Incident risk ratio	95% CI	P value
Male	1.18	1.03 to 1.36	0.02	1.13	1.04 to 1.23	0.003
Age	0.989	0.983 to 0.994	<0.001	0.995	0.991 to 0.999	0.02
Previous self-harm in last year	1.55	1.23 to 1.94	<0.001	1.25	1.08 to 1.43	0.002
>1 year previously	1.39	1.10 to 1.75	0.006	1.26	1.09 to 1.47	0.002
at any time	1.78	1.26 to 2.51	0.001			
Current mental health care out-patient or day-patient	1.31	1.06 to 1.61	0.01	1.32	1.07 to 1.64	0.01
Previous mental health care	n/a			1.15	1.02 to 1.30	0.02
Index episode method cutting	5.12	4.25 to 6.16	<0.001	1.83	1.66 to 2.02	<0.001
other injury (severe)	10.1	5.58 to 18.1	<0.001	1.85	1.47 to 2.33	<0.001
other injury (less severe)	39.7	12.2 to 129	<0.001	2.50	1.92 to 3.25	<0.001
combined	43.7	25.2 to 75.7	<0.001	2.42	2.14 to 2.73	<0.001

Table 2: Odds ratios for switching method on at least one occasion, and incident risk ratios for repeated switching of method, during follow up, according to variables that showed significant effect. Reference categories are: female, no previous self-harm, no current mental health care, no previous mental health care, and (for method) self-poisoning.

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## **Conflict of interest**

NK was chair of the guideline development group for the NICE self-harm (longer term management) guidelines and chaired the NICE self-harm quality standards. Other authors have no declarations to make.

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## **Contribution**

All authors contributed substantially to conception and design of the study on switching method. Owens, Kelley, Bergen, Munyombwe and West also contributed to analysis of data – with statisticians Munyombwe and West planning and undertaking the statistical analysis. Bergen, Hawton, Cooper, Kapur, Ness and Waters were responsible for the collection of the data across the three centres. All authors interpreted the data, Owens, Kelley and Bergen drafted the article, and all authors revised it critically for intellectual content and approved the final version. The First Author had access to all the data and takes responsibility for the integrity of the data and the accuracy of the data analysis.